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ABSTRACT

This study examined the potential relationships between locus of control, field dependence, and stress reactivity in a sample of young adult males (N=40). Locus of control, field dependence, and stress reactivity were measured by the Rotter Locus of Control Scale, the Embedded Figures Test, and the Life Events Survey, respectively. State stress reactivity was measured by a behavioral checklist developed for the study called the Anxious Behavior Checklist. Subjects were asked to complete two speeches, the second of which was significantly more stressful. Their behaviors were observed and recorded. The results indicated that: (1) locus of control was related to field dependence; (2) field dependence had some bearing on stress reporting; (3) social desirability and other variables may be significant factors; and (4) behavioral state stress was an unstable, unpredictable trait that seemed to differ on an individual basis. These findings imply that locus of control and field dependence may not be appropriate constructs for describing personality or behavioral types. A broader theoretical approach was implicated for future research. (The Rotter Locus of Control Scale, the Embedded Figures Test Response Record, the Life Experience Survey, the subject consent form, and the Anxious Behavior Checklist are appended; 12 data tables are included.) (Author/NB)

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LOCUS OF CONTROL, FIELD DEPENDENCE, AND STRESS REACTIVITY IN YOUNG ADULT MALES

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University of Pittsburgh

Submitted in to the Graduate Faculty in the School of Education

in partial fulfillment of the requirements of

the degree of Master of Arts.

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LOCUS OF CONTROL, FIELD DEPENDENCE,

AND STRESS REACTIVITY IN YOUNG ADULT MALES

Janet S. Schweibinz, M. A.

University of Pittsburgh, 1987

This study examined the potential relationships between locus of control, field dependence, and stress reactivity in a sample of young adult males (n = 40) as measured by the Rotter Locus of Control Scale, the Embedded Figures Test, and the Life Events Survey, respectively. State stress reactivity was measured by a behavioral checklist developed for this study called the Anxious Behavior Checklist. Subjects were asked to complete two speeches, the second of which was significantly more stressful. Their behaviors were observed and recorded. The results indicated that locus of control was related to field dependence, that field dependence had some bearing on stress reporting, that social desirability and other variables may be significant factors, and that behavioral state stress was an unstable, unpredictable trait that seemed to differ on an individual basis. These results implied that locus of control and field dependence may not be appropriate constructs for describing personality or behavioral types. A broader theoretical approach was implicated for future research.

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Note: The pronoun "he" occurs throughout this document and is intended in the grammatical sense only. No identification of gender is implied.

I. INTRODUCTION

One of the primary constructs used by researchers to explain human behavior is locus of control (Anderson, 1977; Getter, 1966; Manuck, Hinrichsen, Ross, 1975; Phares, 1968; Strickland, 1970). Locus of control may be interpreted as an individual's perceived source of rewards or reinforcement, and as such may be classified as either internal or external.

The importance of locus of control, or the anticipated source of behavioral reinforcement, was stated by Rotter, Sieman, and Liverant (1962): "If the occurrence of the reinforcements . . . will affect their expectancy for future occurrence then predictive studies of human behavior need to know exactly in what way these expectancies are affected" (p. 473, 474). The literature concerning locus of control is quite voluminous. A basic question within this body of literature involves the utility of internality and externality: Can internality or externality be considered an advantage for the individual concerned, or is an individual's locus of control a neutral factor? This rather broad question recently has been focused in the direction of an individual's manner of coping with stress (Hountras, Scharf, 1970; Joe, 1971; Platt, Eisenman, 1968; Watson, Baumal, 1967). The proposed study

examined this aspect of an individual's locus of control.

II. STATEMENT OF THE PROBLEM

A. Purpose of the Study

This study addressed possible differences in both the effects of life stress on internals and externals and in their performance in a stressful situation. Within the last several years, research examining these effects has reached only equivocal conclusions (e.g., Julian, Lichtman, Ryckman, 1968 and Baron, 1968; Liverant, Scodel, 1960 and Strickland, Lewicki, Katz, 1966). This study examined potential relationships, if any exist, between locus of control, psychological differentiation, and stress reactivity for a sample of young adult males. These results contribute to the understanding of several concepts as yet unclear in the current literature.

B. Research Questions

This study examined three relationships: the relationship between previously perceived stress and locus of control, the relationship between locus of control and psychological differentiation (also called field dependence), and the relationship between locus of control and stress reactivity. The issues addressed in this research concern the potential relationship between reported life stress and locus of control orientation, the interaction between locus of control and field dependence, and the influence of locus of control orientation upon performance in a stressful situation.

While the relationships are not clearly established in the literature, the research questions represent attempts to allow the data collected to "speak for itself".

In this research the following relationships were examined:

1) Is there a relationship between locus of control and life stress reactivity?

2) Is there a relationship between field dependence and life stress reactivity?

3) Is there a relationship between locus of control and state

stress reactivity?

4) Is there a relationship between field dependence and state stress reactivity?

5) Is there a relationship between locus of control and field dependence?

C. Limitations of the Study

A primary limitation to the proposed study is the sample size of forty subjects. This may be too few to make meaningful generalizations to the population at large. This is not likely, however, to diminish the heuristic value of this study. Much of the current literature on locus of control which attempts to further define the behavioral implications of the construct employs samples of this size (Butterfield, 1964; Feather, 1967; MacDonald, Hall, 1969). Studies intending to lay further groundwork in a body of knowledge often utilize smaller sample sizes. The data will ideally serve to support general hypotheses about the interrelationships between locus of control, psychological differentiation, and stress. As Lefcourt (1982) stated, "the questions are evident -- for whom, when, and in what circumstances do these [observed] effects occur?" The current study is designed to answer a small part of that question.

D. Definition of Terms

The term "locus of control" refers to an individual's perceptions of the source of reinforcement obtained by his behavior. Developed by Rotter (1966), it is defined as follows:

> "When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control."

In other words, individuals with an internal locus of control perceive that they are responsible for reinforcers which they experience. Individuals with external locus of control orientations, on the other hand, perceive the control to reside in other areas such as luck, fate, or world powers.

Field dependence is a concept which appears by definition to be closely related to locus of control. The concept was originally formed to describe differential performance in perceptual tasks, but has since been expanded to include other types of psychological processes as well (Witkin, Dyk, Faterson, Goodenough, Karp, 1962). Later research referred to this concept as psychological differentiation, but the two terms are presently interchangeable. Witkin (1962), the originator of the concept, described field independent and dependent types as follows:

> "A high level of differentiation [field independence] implies clear separation of what is identified as external to the self. The self is experienced as having definite limits or boundaries. Segregation of the self helps make possible greater determination of functioning from within, as opposed to a more or less enforced reliance on external nurturance and support for maintenance typical of the relatively undifferentiated [field dependent] state."

Witkin stated the concept in such terms that the overlap with the locus of control construct is apparent. The individual who segregates himself from the environment and "makes possible greater determination of functioning from within" -- the differentiated or field

independent individual -- may be quite similar to the individual who perceives himself to be in control of experienced reinforcement -- the internal locus of control individual. Although not so similar as to be considered alternative forms of the same construct, the two would appear to be related.

The third variable utilized in this proposal was stress reactivity. This may be defined as an individual's reaction to stressful stimuli. There are a variety of methods for measuring stress reactivity, but physiological measures, self report scales, and behavioral observations are the most common. Measured as such, stress reactivity may be defined as an increase in heart rate, galvanic skin response, respiration, self reported anxiety, or overall activity level. In the context of this study stress reactivity was defined as a high level of self - reported stress and as an increase in behavioral activity during the stressful situation.

III. REVIEW OF THE LITERATURE:

A. Locus of Control

The concept of an individual building up a set of generalized expectancies for the internal or external control of his behavior appears to have strong implications for issues involving performance and learning. Once a person has developed an expectation about the relationship between his efforts and reinforcement obtained the effects of that reinforcement will change accordingly. If a person sees his behavior as being responsible for the reinforcement that behavior is likely to occur again. If, on the other hand, the person views the reinforcement as having to do with chance, fate, luck, or a powerful other, he is not as likely to repeat the antecedent behavior. This is the key implication of locus of control in studies involving learning and behavioral observation.

Internal and external control may be understood in many ways, such as a person's own characteristics vs. the characteristics of others; chance vs. skill; or one's own potential to control the environment vs. the influence of others (Rotter, Seehan, Liverant, 1962). A person with an internal locus of control orientation generally believes that what has, is, or will happen in a given situation is directly related to what he has, is,

or will do in those situations. He feels that if there were good results, he must have worked hard enough, performed skillfully enough, or exhibited some correct response to make it so. If there were bad results, he must improve a skill, try harder, or do something else. An individual with an external locus of control, in contrast, believes that his satisfactions are derived from luck, other people, fate, or "just one of those things." Externals are often passive, feeling that there is no use in engaging in respondent behavior since what happens is not dependent upon that behavior. This may appear to be similar to a lack of confidence.

In a similar vein, Riesman (1954) proposed a typology based on the degree to which people were controlled by internal goals and desires and the degree to which they were controlled by external forces, in particular social forces or conformity forces. This conception was initially condisered a precurser to Rotter's theory, but a fundamental difference precludes this type of comparison. Reisman's theory focuses on the control one has over his behavior, not the perception of control over reinforcement. As such, this concept remains distinct from locus of control.

Both locus of control and the concept of ego control contain the ideas of confidence and one's ability to deal with reality. It seems likely

that people at either extreme on locus of control measures would probably have very low scores on ego control measures as well (Rotter, Seehan, Liverant, 1962). Ego control might bear some curvilineal relationship to the variables in this proposal, but, like Riesman's conceptualization, remains significantly distinct that it need not be accounted for in a study of locus of control.

The first experimental study on the differences between people with internal and external perceptions of control was done by Phares (1957). His experiment involved ambiguous color matching and length comparison tasks. Some subjects were told that success was a matter of skill. Others were told that the tasks were so difficult that success was purely the result of chance. The subjects who were told that success was a matter of skill succeeded more often and responded with more correct responses when reinforced than did subjects who believed success to be up to chance. Phares then devised a scale to measure this belief in skill or chance related reinforcement, but was unable to make a useful scale to predict skill-related performance (internality). His scale measured only one's belief that success is primarily up to chance occurrences (externality). This was the first forerunner of the Rotter I-E Locus of Control Scale, which is often used in contemporary research (Rotter, 1966).

The next significant study of internality and externality was done by James and Rotter (1958) and focused on the ease with which learned behaviors were extinguished in a laboratory setting. When subjects were told that a task was skill related, they resisted extinction, responding more frequently than would be expected after decreasing reinforcement. Subjects who were told that the task was not related to ability stopped responding as soon as the reinforcement schedule was interrupted. This demonstrated for the first time that there was a difference in the way people perceive reinforcement and that this difference impacted on the behavior exhibited (Rotter, Seeman, Liverant, 1962). This implied that locus of control was a theory with effects which could be behaviorally observed.

Locus of control may be thought of as a continuous variable -- a sort of perceptual continuum. Externals tend to be passive, internals tend to be creative and non-conforming, and those in the middle tend to be somewhat more moderated. Rotter (1962) said of these middle types that " . . . although they cannot change the world, they can by greater understanding of it increase their own satisfactions" (p. 475). These people tend, from outward appearances, to have the best adjustment to daily life.

People with an external perceptual set tend to appear passive, as

previously mentioned. The first study examining this was done by Seeman and Evans (1962). Their study examined tuberculosis patients in a hospital and compared them on how much they knew about their own condition, how many questions they asked, and how satisfied they were with the feedback given to them. These were thought to be behaviors indicative of attempts to control the environment. Studying 43 pairs of subjects matched on race, sex, occupational status, education and ward placement, they found that internals knew more about their own condition, questioned the caregivers more frequently (according to staff records), and expressed less satisfaction abouta the level and quantity of feedback they were given. This reslts have been replicated in other research contexts as well. Phares (1965), for example, selected compared two groups of college students matched on their attitudes toward fraternities and sororities on campus. Each group was instructed to attempt to change the views of the other. The internal group was more successful in changing the external's viewpoint.

There are four prevailing views on the apparrent passivity of externals. Why do they seem to feel that they cannot effectively impact their environment? One possibility is that they believe the world to be non-rational or non-deterministic. If luck or chance rule the consequences one receives, one could not possibly attempt to alter that

by one's own behavior. A second view is that fate controls the consequences of behavior. This implies that, since everything is predestined to happen, one's own actions could not possibly alter that. A third view is that strong, powerful others control reinforcement. Actions against such strong forces would be useless. The final view of external passivity is that the world is simply too complex to be predicted.

Internals and externals also differ in their manipulability, a concept closely tied to passivity. Gore (1962) studied internals and externals who were administered the TAT. In one group the experimenter overtly attempted to influence the subject's answered by telling him which card was "the best". In the second group the experimenter subtly influenced the subjects by introducing the favored cards with statements such as "Now let's see what you do with *this* one". The final condition was a control of no influence. This study found that there was no difference in internal's and external's response lengths (a long response constituting a better resonse) when the overt influence and control situations were compared, but did find a difference in the condition of subtle influence. Internals tended to give shorter responses than externals, as if resisting the subtle suggestion of the experimenter.

Three general conclusions have been derived from the early experimentation with the locus of control construct:

1) people do develop generalized expectancies about reinforcement which are consistent and stable over time.

2) these expectancies vary with the differences in the ways people respond and in the way they perceive.

3) The most significant evidence of the validity of internality - externality comes from correlations with behavioral criteria (Rotter, 1966).

B. Locus of Control and Field Dependence

Field dependence, or one's ability to separate self from the surroundings, appears to be related to locus of control. Field dependence tends to be age related during childhood. Very young children are always field dependent, unable to clearly distinguish between themselves and their environment; they become more field independent as they develop (Witkin, Dyk, Faterson, Goodenough, 1962). Field independence allows for psychological specialization. An individual with a clear separation between self and surroundings can begin to separate areas within himself, such as thinking from acting or feeling from perceiving. Field dependent people often cannot separate psychological areas such as emotion and perception as well as field independent people. The implication of this is that a more field independent person could be more likely to comfortably handle situations not negotiable to a less differentiated person. There is some empirical demonstration of this. Increased ability to handle difficulty has been associated with greater separation of perception from emotion as measured by perceptual defense tasks ($r = 0.45$) (Minard, Mooney, 1969).

Greater field independence implies a clear separation of what is

identified as belonging to the self and what is external to the self. Segregation of the self makes possible greater determination of functioning from within (a concept by definition similar to internal locus of control). Field dependence involves enforced reliance on external nurturance and/or support for daily maintenance (Witkin, Dyk, Faterson, Goodenough, 1962). Field dependent people tend to be more conforming, as they tend to be environmentally determined rather than self oriented (Rotter, Seeman, Liverant, 1962).

Many studies have examined the relationship between field dependence measures and performance. Bieri (1960) examined the relationship between resonse acquiescence on questionnaires and field dependence. There was no clear relationship found between field dependence and the willingness to acquies or conform.

Another study examined these relationships in a different manner, obtaining different results. In this study, some of the subjects were permitted to view other subjects' performances and given other subjects' scores before completing a written performance task themselves. Other subjects were not given this information. When the results and performances were public field dependent subjects performed more like the others than did field independent subjects. In private conditions this was not the case (Gabrenya, Arkin, 1979). This

supported the idea that field dependent subjects would be more influenced by the performances of others than would field independent subjects.

A third study of the same variables examined the ability of two person groups to resolve differences and reach a compromise (Witkin, Dyk, Faterson, Goodenough, Karp, 1962). This study examined dyads composed of dependent / dependent, independent / independent, and dependent / independent subject pairings. It was found that when both subjects were field independent they were less likely to resolve their conflict (65% of conflicts were resolved). Those dyads consisting of two field dependent members were most likely to resolve their conflict (95%), while the mixed pairs were intermediate (82%). Again, it would seem that the field independent subjects were less affected by the other subjects' performance, while the field dependent subjects were more likely to conform. This is the general conclusion that may be derived from this research, but it is not without exception, as noted in the Bieri (1960) study.

Another study of the relation between field dependence and performance was done with 54 acountants (Gul, Zaid, 1981). This study differed from the previous study in that it gave subjects only ambiguous data, not clear information on the performance of others. Subjects were

asked to make accounting-related decisions based on a set of ambiguous data. Field dependent subjects were more confident in the appropriateness of their decisions than were field independent subjects. It appeared that the field dependent subjects were more willing to use ambiguous data to make a decision than were the field independent subjects. Witkin and Goodenough (1977) concluded that field dependent subjects are more likely to use external referents and ambiguous data than are field independent subjects.

Bloomberg (1965) researched the susceptibility to distraction of field dependent vs. independent subjects. Using a reversable visual pattern, subjects' selective attention abilities were observed while they were uninterrupted and while they were being distracted with verbal tasks. The results implied that field independent subjects were more affected by the distracting stimuli than were field dependent subjects. The implications of this are not clear, but it is likely that field independent individuals are more subject to distractions than are field dependent individuals.

As stated previously, the locus of control and field dependence concepts appear to overlap. Rotter (1966) claimed that the two were most likely related. Researchers have attempted to discern the nature and extent of this relationship and found that the two constructs were not

as closely related as it might appear. Rotter (1966) in an early study, measured college students with precursors to the popular Rotter Locus of Control and Witkin Embedded Figures tests and found no relationship between individual measures of locus of control and differentiation. In spite of the data, however, Rotter asserted that the constructs were indeed related! This lack of correlation was repeated by Deever (1968), who found no significant relationship between measures of psychological differentiation and locus of control.

Several more recent studies have also failed to demonstrate some relationship between these two constructs (McIntire, Deyer, 1973; Nisbett, Temoshok, 1976; O'Leary, Donovan, Hagye, 1974; Roodin, Broughton, Vaught, 1974; Strahan, Huth, 1975). Yet, two studies stand out as exceptions to this. One, by Massari and Rosenblum (1975), examined third grade girls and found a weak correlation between differentiation and internality in one out of four girls (25% of the sample). The other 75% of the sample showed no discernible relationship. The second study examined school age boys and girls (Crandall, Lacey, 1972). They found a small but significant correlation between the concepts, but when age and IQ were partialled out the relationship among the boys dropped to insignificance. The correlation among the girls, however, remained strong. This was a strong implication that

gender may be a confounding variable when examining locus of control and field dependence. This has been confirmed by several other studies (Bieri, 1960; Bloomberg, 1965; Honigfeld, Spiegel, 1960; Witkin, Dyk, Faterson, Goodenough, Karp, 1962).

In light of these two studies, the relationship between differentiation and locus of control is anything but established. An earlier study offered a potential explanation for the seemingly conflicted research literature which has been largely accepted by current researchers (Deever, 1968). This study required subjects to examine a card on which two lines had been drawn and state which of two lines was longer and how certain they were of the correctness of their response. Subjects were provided with feedback on their responses irrelevant to their actual correctness and were also told how their responses related to those of a norm group. It was found that both internal and differentiated subjects reported greater confidence of success in their responses and differed the most from the norms, but that the locus of control and differentiation measures themselves were unrelated ($r = .02$). This was a very significant finding, as it implied that the two constructs were indeed uncorrelated factors but that they affected behavior in similar ways.

A replication of this study (Lefcourt, Telegdi, 1971) supported

Deever's conclusions. Both studies found no correlation between measures of differentiation and locus of control. They did find, however that both constructs were similar in predicting assertiveness, the experiencing of oneself as a distinct source of causation, and the tendency to be self-reliant rather than acquiescent and conforming. According to this research, locus of control and field dependence may be two variables which function in disparate, unrelated manners but can result in similar outcomes.

A second possible explanation for the conflictions in the literature was given by Minard and Mooney (1969). They proposed that the clinical procedures used distorted the variables they were intending to measure. They asserted that "as long as clinical procedures are used, critical readers may be convinced differentiation could have contaminated all other evaluations and may use this as a basis for rejecting much research on correlates of differentiation" (Minard, Mooney, 1969, p. 131). This hypothesis has largely been rejected as too simplistic. The clinical experimentation studies which did find significant correlations also refute this.

C. Locus of Control and Stress

When examining the relationship between locus of control and stress, two questions arise: 1) Does previous stress produce either perceptual orientation, or 2) Does either perceptual orientation produce different responses to current stress? The first relationship, that between previous stress and current orientation, has come under rather extensive examination. As with locus of control and field dependence, locus of control and stress research yields seemingly conflicting patterns. There are two predominant views on the interaction of these variables. The first view states that each variable makes an independent contribution to an individual's state and combines with other contributions in an additive fashion (Cooley, Keesey, 1981; Manuck, Hinrichsen, Ross, 1975; McFarlane, Norman, Steinzer, Roy, 1983). The second view holds that the two interact to produce an effect greater than the addition of each alone (Johnson, Saranson, 1978; Lefcourt, Miller, Ware, Sherk, 1981; Miller, Cooley, 1981; Sandler, Lakey, 1982; Wheaton, 1983). The focus of this view is on the match between stimulus conditions and the perceptual set of the individual.

Much of the related research focuses on the subject's perception of stress and its relation to his perceptual style. The inference is made

that internal control generally leads a person to perceive himself as having more control over negative events and that this perception of control leads to a lower stress level. While this seems logical, some studies support this while others do not (Sandler, Lakey,1982). One study examining this involved measures of control orientation and measures of life events and found that externals tended to rate their life events as more stressful than internals (Sandler, Lakey, 1982). This was supported in a study by Anderson (1977) which measured entrepeneurs on internality and stress perception over a two and one half year period. These findings supported the hypothesis that internals perceived less stress from events experienced than externals. Other research has also supported this concept (Kilmann, Laval, Wanlass, 1978; Manuck, Hinrichsen, Ross, 1975). Ganellen and Blaney (1984) examined this relationship and found no statistically significant correlation between externality and stress ($r = - 0.04$, not statistically significant). This was duplicated in another study which also found no significant correlation (Brewin, Shapiro, 1984). The implication of this conflicting research was that if a relationship existed, a significant and relevant factor existed that was not being addressed.

One study which attempted to identify one such important factor was conducted by Manuck, Hinrichsen, and Ross (1975). They found

that there was a significant relationship between current stress experienced in a given situation and externality, but only for people who had encountered low levels of life stress up to the time of the experiment. This introduced the factor of state (or current) stress, as distinct from life stress. This concept was explored additionally by a study which found that internal and external subjects reported the same amount of stressful life events on the whole, but that externals rated the events as more stressful (Kilman, Laval, Wanlass, 1978). Correlations with state stress were not significant. This was also found by Anderson (1977).

Although relationships between internality - externality, life stress, and state stress are not clear, relationships between internality - externality and state stress have been more clearly demonstrated. Many authors have found that externals tend to experience greater distress and utilize more non-constructive responses in stressful situations (Butterfield, 1964, Feather, 1967; Hountras, Scharf, 1970; Liberty, Burnstein, Moulton, 1966; Tolor, Reznikoff, 1967; Watson, Baumal, 1967). A study done by Watson and Baumal (1967) yielded a positive correlation between externals and debilitating, non-facilitative anxiety ($r = .25$) and a very small negative correlation between externals and facilitating anxiety ($r = -.08$). When examining anxiety it appears

that desirable life events have no effect, but that undesirable event do. One cannot simply examine life changes without qualifying these changes as negative or positive (Vinokur, Selzer, 1975). It has also been found that negative events occurring years in the past have more effect on external rather than internal subjects (Lefcourt, Miller, Ware, Sherk, 1981). Recent negative events seem to have an equal effect.

Externals have been found to rank higher on anxiety measures in general than internals, but a question has been raised by this work (Platt, Eisenman, 1968). Since locus of control scales are self report measures and yield information only on an individual's perception of himself, does a belief in external control produce anxiety or does anxiety produce a belief in external control? Is externality a defense or a reaction against anxiety, or is anxiety a learned reaction to a perception that the world is unpredictable, predetermined, or controlled by powerful others? In attempts to resolve this issue, researchers have placed subjects in environments which were obviously manipulated by the experimenters and observed their reactions. If externality was a defense, the manipulated environment should have had no effect upon it. If externality was a reaction to the environment, a shift toward externality would be demonstrated. One task used in this type of work was verbal conditioning in which learned syllables were first reinforced

and later extinguished (Getter, 1966, Strickland, 1970). Since the subjects were made aware of the reinforcement and extinction contingencies (the environmental manipulation) it was expected that the externals would react with greater anxiety than the internals. This theory was supported. It has not been supported, however, by other research (Efran, 1964; Lipp, Kolstoe, James, Randall, 1968; MacDonald, Hall, 1969; Phares, 1968). These researchers found that externals did not perceive higher levels of stress in these types of situations than internals did. It has been suggested that response bias is the primary factor in this apparent conflict in the literature (Krause, 1985), but that explanation seems too simplistic considering the apparent complexity of the relationships in this area.

The research on the differential reaction of internals and externals to anxiety has been inconclusive. Relationships that exist, if indeed a relationship does exist, have not yet been established. If the research lends support to any concept, it is that there is no conclusive relationship between internality and reactions to stress (Baron, 1968; Julian, Lichtman, Ryckman, 1968; Lefcourt, Steffy, 1970; Liverant, Scodel, 1960; Minton, Miller, 1970; Strickland, Lewicki, Katz, 1966).

D. Summary of the Literature Review

In summary, it may be stated that the current body of research contains these implications:

1) Subjects with external locus of control orientations tend to be more passive than subjects with internal locus of control orientations.

2) Internals tend to be more non-conforming than externals.

3) The most significant evidence of differences between externals and internals comes from correlations with behavioral criteria.

4) Field dependent subjects are more affected by the performance of others than are field independent subjects.

5) Field dependent subjects are more willing to use ambiguous data to make decisions than are field independent subjects.

6) Field dependent subjects are less distracted by extraneous stimuli than are field independent subjects.

7) Gender is a significant factor in studies of field dependence and locus of control.

8) Locus of control may be uncorrelated with field dependence but be correlated similarly with specified outcomes.

9) Past stress and locus of control are not clearly correlated.

10) State stress may be important when examining past stress and locus of control.

11) Externals tend to report past events as more stressful than internals.

12) Externals tend to experience experimental events as more stressful.

IV. RESEARCH DESIGN

A. Sequence of Data Collection

The data collection procedures employed a mixed design in which the classificatory variable was internality / externality (Campbell, Stanley, 1966; Neale, Liebert, 1986). Subjects were compared on the basis of their perceptions of previous life stressors, reactivity in a stressful lab setting, and field dependence scores. The design may be schematically represented as follows:

$$O_1 \quad X_L \quad O_2 \quad X_H \quad O_3$$

The O's in this case represent observations made. The X's represent the exposure of each individual to an experimental event. All of the subjects were run in this sequence; no counterbalancing was done.

B. Specific Procedures

Each subject completed the lab session individually. Each lab session was attended by the primary experimenter, a secondary confederate, and two behavioral observers who remained blind to the purpose of the study. Two rooms equipped with observation windows and monitoring devices were used. One of these was comfortably furnished and decorated, referred to as the low stress room, and the other contained only a hard chair and student's desk, referred to as the high stress room. The low stress room contained no obvious monitoring equipment, but the high stress room contained a microphone, tape recorder, and monitor which was prominantly displayed on the desk.

When a subject arrived he was greeted by the primary experimenter and taken to the low stress room. After written consent was obtained, the experimenter left the room. During the ensuing five minute period of time the behavioral raters recorded all of the subject's behavior on the Anxious Behavior Checklist. This behavioral pattern constituted the subject's baseline behavior in the lab.

LOW STRESS PROCEDURE

After the baseline period was completed, the examiner entered the room and instructed the subject to prepare to give a short talk on a favorite activity or hobby of his. Care was taken to present this in a non-threatening manner. The experimenter left the room to allow the subject five minutes to prepare, and the raters again recorded his behavior. This constituted the low stress pre-speech observation. The experimenter then briefly entered the room and instructed the subject to begin speaking. During the speech the subject was alone in the room, but the speech was tape recorded and the raters recorded his behavior. The subject did not know that he was being recorded. This constituted the low stress speech observation.

After the three minutes allotted for the speech had elapsed (regardless of the completion of the speech) the experimenter entered the room and administered the Embedded Figures Test and the WAIS-R Vocabulary subtest. This took approximately 50 minutes. The testing helped to insulate the high stress procedure from the low stress procedure to minimize the carryover effect. When the testing was

completed the subject was taken to the high stress room.

HIGH STRESS PROCEDURE

Upon entering the high stress room the experimenter instructed the subject to prepare to give another speech. He was informed that this speech was tape recorded and that a female member of the research team (the secondary confederate) would be present to observe and "evaluate" him as he spoke (ie., hold a clipboard and frequently make notes, seemingly evaluating the speech). The topic of the speech was what he liked and disliked about his body. No further instructions about the speech were provided. This was done in a terse manner with little non-verbal reinforcement and no verbal reinforcement. The examiner then left the room to allow the subject to prepare, entering briefly every minute to inform the subject of the time remaining. The raters recorded the subject's behavior during this time. This was the high stress pre-speech observation.

When the preparation time had elapsed, the experimenter entered the room with the secondary confederate. The subject was informed that the other researcher could not interact with him in any way, including answering questions or telling him when the time was

completed. The primary experimenter then left the room and the subject gave his speech to the secondary confederate examiner. The secondary examiner watched the subject but did not make eye contact at any time during the speech. She did not smile nor otherwise give non-verbal reinforcement. The raters recorded the subject's behavior during this speech, constituting the high stress speech observation. When the three minutes allotted were complete, the examiner entered the room and returned to the low stress room with the subject, who was then debriefed and administered the Rotter Locus of Control Scale and the Life Events Survey. The debriefing centered on the "normality" of the subject's responses and assured him that the experiment was designed expressly to induce anxiety. Any questions he had about the study were answered at this time.

The two scales were administered after the stress procedures for three reasons. First, the scales were initially scheduled to be mailed to the subject's home for completion there, but the packets that went to the first several subjects did not include the scale. It was thought better to administer all of the scales in the same situation, so all of them were administered after the lab session. The main potentially negative effect of this was the potential effect of the procedures on the subjects'

responses. Any effects of the stressful lab procedures on the subjects' responses would most likely be consistent across all subjects.

Given this, the justification for this procedure was, first, that it allowed the subject to "cool down" from the stress of the second speech. The experimenter also had opportunity to observe that the subject's emotional state had mediated before releasing him from the lab setting. Second, since these two scales were written instruments they may have been perceived as "tests". Although these scales do not require great proficiency in reading and writing, subjects may have felt anxiety over poor reading or writing abilities when the scales were presented. Any effects of this anxiety or general test taking anxiety did not contaminate the stressful lab procedures.

An outline of the procedures described above may help clarify the flow of the lab sessions.

1) The subject arrived and was taken to the low stress room for baseline observation (5 minutes).

2) The subject was instructed to give the speech about an activity and left alone to prepare (5 minutes). Low stress pre-speech observation was made.

3) The subject gave the low stress speech (3 minutes).

Low stress speech observation was made.

4) The subject was tested. No observations were made.

5) The subject was taken to the high stress room and allowed to prepare for the speech about his body (5 minutes). High stress pre-speech observation was made.

6) The subject gave the high stress speech (3 minutes). High stress speech observation was made.

7) The subject was taken back to the low stress room for debriefing and testing. No observations were made.

C. Research Sample

The sample consisted of 40 white men aged 18 to 24. The subjects were obtained from a population of subjects involved in a study of young males and their drinking habits conducted by Blane at the University of Pittsburgh from September to December, 1985. This subject population was obtained from a pool of subjects formerly studied in the Family Research Project conducted by Jacob at the University of Pittsburgh. The subjects in the Family Research Project were recruited from the community and selected on the basis of the father's untreated alcoholism, clinical depression, or freedom fron any psychiatric symptoms. These families were studied approximately ten years prior to the current study. It was presumed that the current subject population represented a fairly normal population of young adult males, but the data collected were examined for possible effects of the subjects' differing family backgrounds.

The sample was restricted to males of a limited age group because sex and development have been found to be variables that affect the predicted relationships between locus of control and field dependence measures substantially (Bieri, 1960; Bloomberg, 1965;

Honigfeld, Spiegel, 1960; Witkin, Dyk, Faterson, Goodenough, Karp, 1962). The sample size of 40 was similar to sample sizes of much of the current literature [ie.: Dua, 1970, n = 30; Feather, 1968, n = 46; Hamsher, Geller, Rotter, 1968, n = 60; Harvey, 1971, n = 14, 7, 27, 21; Hersch, Scheibe, 1967, n = 47, 38; Hsieh, Shybut, Lotsof, 1969, n = 38, 42; Lefcourt, Steffy, 1970, n = 37; Levy, 1967, n = 24; Schneider, Parsons, 1970, n = 44, 67, 74, 24, 41; Strickland, 1965, n = 53, 27, 34, 46, 49, 21]. The 24 studies cited above have an average subject population of 38, very similar to the proposed study's sample size. It was presumed that the subjects would be fairly representative of 18 - 24 year old Pittsburgh men.

Subjects were paid for their participation in the study. A packet of questionnaires were mailed to the subjects to be filled out at home concerning drinking, socializing, family, and demographic information. The subjects were paid $15 for completing the packet. Subjects who completed the laboratory procedures were paid an additional $35.

D. Instruments

Locus of control was measured by the Rotter Locus of Control Scale (Rotter, 1966). This scale has been widely used in locus of control research (Anderson, 1977; Brewin, Shapiro, 1984; Liberty, 1966; MacDonald, Hall, 1969; Phares, 1968; Sandler, Lakey, 1982; Strickland, 1970; Watson, Baumal, 1967). Indicative of its popularity Rotter's original article (1966) was cited 2735 times as of February, 1982 (Brewin, 1984). Clearly this construct and its related instrument have become well accepted in the psychological body of literature.

The locus of control scale consists of 29 forced choice items, six of which are filler items. Item analyses and factoral analyses have demonstrated a reasonably high internal consistency, with correlations of 0.70 to 0.79 (Joe, 1971; Rotter, 1966). The test - retest reliability with two month intervals have been good with most correlations ranging near 0.83. Some studies, however, have resulted in correlations lower than that, ranging near 0.49 (Joe, 1971; Rotter, 1966). This is though to be indicative of the use of earlier forms of the test rather than faults in the present instrument.

The discriminate validity of the scale has been demonstrated by low correlations with measures of intelligence and political liberalness (Rotter, 1966). Some studies have found no significant correlation with measure of social desirability (Rotter, 1966), while more recent studies have found a small but significant correlation (Joe, 1971). At present the relationship betwen locus of control scores and social desirability remains to be clearly demonstrated.

A recent examination of the scale using factorial analysis seemed to suggest that the locus of control concept may be more complex than the current linear approach would imply (Brewin, Shapiro, 1984). This possible complexity would make a significant difference between locus of control when considering negative versus positive events. Brewin and Shapiro suggested that the Rotter scale may be better suited for examining responsibility and attribution for positive events rather than negative events. These conclusions may be viewed with some skepticism, however, as replication or corroboration have yet to be conducted.

Psychological differentiation was measured by the Embedded Figures Test, or EFT (Witkin, 1966). This test is also the instrument of choice when measuring differentiation (Crandall, Lacey, 1972; Deever,

1968; Lefcourt, Telegdi, 1972; Massari, Rosenblum, 1975; O'Leary, Donovan, Hague, 1974; McIntire, Deyer, 1973; Strahan, Huth, 1975). The test purports to measure an individual's capacity to extract an item from the field in which it appears (Denmark, Havlena, Murgatroyd, 1971). It is generally regarded as the best measure of differentiation available. This is largely due to its firm grounding in empirically validated theory. As test evaluator Gough stated, the notions of field dependence, cognitive clarity, analytic versus global perceptual mode, and general disposition "are not just ad hoc comments on the apparent nature of the test, but are basic theoretical principles arising from a vast amount of careful and convincing experimentation . . . Indeed, one of the most attractive features of this test is its firm anchoring in a systematic context of theory and empirical evidence" (Gough, 1972, p. 89).

The discriminant validity of the EFT has been generally considered satisfactory, but some parallels to intelligence have been indicated (Gough, 1972). The primary similarities occurred with tasks involving complex visual stimuli, such as the Raven matrices or Cattell's culture fair test. Traditional measures of intelligence, such as the Wechsler tests, have not found to be significantly correlated. Other

measures of field dependence correlate highly with the EFT (Denmark, Havlena, Murgatroyd, 1971).

Reliability coefficients have been very good, with test - retest correlations with three year intervals of 0.89 and split half and equivalent forms reliabilities of over 0.90 (Fogliani-Messina, Fogliani, DiNuovo, 1983; Tyler, 1972; Witkin, Oltman, Raskin, Karp, 1971). These coefficients indicate that the test measures a stable and enduring characteristic. As test reviewer Tyler stated, "whatever this trait is, individuals manifest it consistently on different parts of the test and at different times" (Tyler, 1971, p. 90). Scores have, however, been found to increase in elderly populations.

Life events stress reactivity was measured by the Life Events Survey (Saranson, Johnson, Siegel, 1978). This instrument requires subjects to note which events they have experienced in the last year, as well as rate the level of stress (positive or negative) they caused. This scale not only yields information on the frequency of stressful events experienced by the subject, but also yields a qualitative dimension. This is an important difference from earlier scales. Earlier scales asked subjects whether certain events had occurred and then used group referent scores for assigning a "stress rating" to the events reported (ie.,

marriage = 500, graduation from school = 750, etc.). Self-rating the events reported is now thought to be imperative to the proper understanding of the phenomenological significance of potentially stressful events (Lichtenstein, Crane, 1969; Saranson, Johnson, Siegel, 1978). Redfield and Stone (1979) conducted a study in which they asked subjects to record events which they found stressful and to indicate on a Likert-type scale how stressful they were. The researchers factor analyzed the events reported and found that these events represented a multidimensional factor. This implied that group referents for stress ratings would be inappropriate. Yamamoto and Kinney (1976) found that self ratings of the amount of stress associated with life events are better predictors of the stress encountered than using group referents. This lends even more support to the approach used in the LES. As Vinlkur and Selzer (1975) stated, "it seems reasonable to reject the notion that adjustment to change per se is the crucial determinant of life stress and its sequelae. Instead, it appears that the contribution of life events to psychological impairment is mediated by stress that is evoked by some undesirable aspect of the events rather than by change per se" (p. 333, 334).

There has been recent discussion around the significance of

negative versus positive stressful events reported on the scale. Some researchers state that negative changes are more significant and more predictive than positive or overall change scores (Saranson, Johnson, Siegel, 1978). This statement has not yet been corroborated and must be viewed with some hesitance.

Test - retest reliabilities have been calculated for the LES, with positive change scores correlationg 0.19 - 0.53, negative change scores 0.56 - 0.88, and total change scores 0.63 - 0.64. These correlations are near what would be expected, since the measurement of stress experienced in life may be expected to change with time. As more events are experienced and other events age beyond the one year limitation of the scale scores obtained would naturally change. The subjects' memories of events experienced may also be a significant factor. Given these limitations, the scale appears to be the best available for guaging life stress.

Stressful behaviors were recorded using an instrument developed for this purpose by the current examiner called the Anxious Behavior Checklist. This is a scale which lists behaviors thought to indicate state anxiety (ie., hand movements, leg movements, foot movements, body movements, etc.) and is deemed apropriate for this study due to the

better correlations obtained with locus of control when behavioral criteria are employed. Development of the scale involved eight male subjects of the same age as the prospective sample. Each was either taken through the high stress procedure or instructed to visualize a situation which would make him nervous and act accordingly. The behaviors on the ABC are primarily the behaviors exhibited by this group of subjects, but a few additional behaviors were included which were not demonstrated by the sample (such as pacing). It is thought that these behaviors are indicative of stress. Since the score obtained on this scale is a frequency count, not a qualitative measure or a percentage score, this procedure is thought to be adequate for determining a set of behaviors which indicate stress. A high frequency of these behaviors is thought to indicate a large amount of stress, while a low amount of behaviors would indicate a low amount of stress.

The raters using the scale were trained in its use by rating videotaped subjects' behaviors and comparing their ratings with the master rating for accuracy. The master rating was a rating obtained by the experimenter using the quantified measures for each behavior (ie., precisely what constituted a foot tap, arm swing, etc.). It was important that the raters all assign the same name to the same behavior and

attend to the same behaviors in the subjects. Inter-rater reliability reached 70% before the actual experiment began. Before running actual subjects, "dummy" subjects were be run to insure reliability with live subjects rather than videotape. If interrater reliability dropped below 70% at any time during the study the raters were retrained. Three raters were used per subject if possible, but two raters were used if scheduling three was impossible. No subjects were run with less than two raters.

E. Treatment of the Data

The data were examined using Pearson correlation coefficients. Correlations were calculated between internal Locus of Control scores and Embedded Figures Test scores, Life Events Survey scores (using positive change scores, negative change scores, and total change scores), Anxious Behavior Checklist scores, and WAIS-R Vocabulary scores.

The correlations obtained were tested for significance with the tabled figures for significant correlations. This helped provide a more accurate correlation by adjusting for sample sizes (via degrees of freedom), thus lowering the possibility of false conclusions due to sample size (Edwards, 1976). Correlations were compared with the

significance figure for the appripriate degrees of freedom. If the revised figure was lower than the obtained correlation, the correlation was significant. If the revised figure was higher, the obtained correlation was not statistically significant.

Data on the LOC and EFT were analyzed between groups (COA, COD, CON) to determine if there were any significant differences. Data on the LOC and EFT were also analyzed as measured by the LES and the ABC with a 2 x 2

ANOVA. This determined if the locus of control and field dependence were interacting in any significant way.

V. RESULTS

Data obtained on the LOC scale were analyzed as raw data, with higher scores reflecting greater levels of internality. The sample mean was 13.475 (see Table 1). The population mean for subjects of this age group is 10.07 (Schneider, Parsons, 1970).

For ease of comprehension, Embedded Figures Test scores (EFT) were altered according to the following formula:

$$200 - EFT_{obtained} = EFT$$

The result of this transformation was higher scores corresponding to greater field independence. This corresponds with the LOC scores in which higher scores correspond to greater internality. The sample mean was 52.158 (see Table 2) which falls within the population mean range of 45.5 - 54.3 for males in this age group (Witkin, Oltman, Raskin, Karp, 1971).

Scores on the LES were utilized several ways. The LES frequency represented the total number of stressful events the subject indicated on the survey. Population means given for the LES were for the sum of the ratings for the positive and negative events. The sample mean for negative events was 21.10. The mean for the population was

10.22 (see Table 3), approximately half the sample amount. This sample reported almost twice the amount of negative events than the population at large. For positive events the means were not significantly different: 11.00 for the sample and 9.74 for the population. Summing the ratings for positive and negative events may yield misleading scores. The scale includes several items over which the subject would have little or no control, such as the death of a family member or a serious illness. To examine only the subjective aspect of the data, scores were computed which yielded the average rating for the negative events and the average rating for the positive events. LES $\mu > 4$ represented the mean value of the negative events, and LES $\mu < 4$ represented the mean value of the positive events. (Four was the rating which meant that an event had "no impact".) The average number of stressful events reported for each subject was 10.45.

Data obtained on the ABC scale were reported for each observation period (ie., ABC1, ABC2, ABC3, ABC4, and ABC5), and then converted to scores reflecting the mean frequency of behaviors exhibited per minute. Scores were then subtracted to obtain the change in behavioral frequency over three periods: ABC baseline to low stress, ABC low stress to high stress, and ABC baseline to high stress. The

largest change was exhibited by subjects over the low stress to the high stress procedures (baseline to low stress change score had a mean of 1.394 and a range of 67; low stress to high stress change score had a mean of 3.457 and a range of 62; baseline to high stress score had a mean of 1.826 and a range of 12.3: see Table 4).

Data obtained on the LOC scale were compared across the three subject subgroups to check for significance. Mean scores for the children of alcoholic fathers, depressed fathers, and normal fathers were 13.364, 15.545, and 12.278 respectively. These differences were not statistically significant (one way ANOVA; $p = 0.1053$: see Table 5). Scores on the EFT were also compared over the three groups, yielding means of 47.749, 115.92, and 86.83. These differences, while greater than those of the LOC, were also not significant (one way ANOVA; $p = 0.1723$: see Table 6). Because of this, the three groups were treated as one group with respect to LOC and EFT.

Locus of control scores were compared with scores on the EFT, WAIS-R vocabulary scores, all obtained ABC scores, all ABC change scores, and all LES scores (see Table 7). The only relationship of significance at the 0.05 level was locus of control and field dependence ($r = 0.31$), with internality varying with field independence. The

relationship between internality and intelligence (r = 0.27) was significant at the 0.10 level but not at the 0.05 level. The relationships between all LES scores and LOC scores were small and insignificant (ranged from r = -0.097 to r = 0.111).

Embedded Figures Test scores were correlated with the same scores (see Table 8). Other than the relationship between EFT and LOC mentioned above, three correlations were statistically significant. EFT and WAIS-R vocabulary scores were significantly correlated with r = 0.48.

None of the correlations with ABC change scores was significant. Only one correlation with the raw ABC data was significant -- the correlation between EFT and ABC3 scores (r = 0.353),. The correlation between EFT and ABC5 scores (r = 0.258) was also significant at the 0.10 level but not at the 0.05 level.

EFT and LES frequency scores were correlated (r = 0.336), with no other LES scores significantly correlated at the 0.05 level. Two additional correlations were significant at the 0.1 level (LES < 4, r = 0.279; LES μ > 4, r = 0.285) but not at the 0.05 level.

Comparisons were done using the 20 subjects (half of the n = 40) with the most extreme scores on the LOC and EFT to determine if the

central scores had obscured any potential findings. No additional relationships were found. Comparisons were done using only the 20 subjects scoring in the central ranges of both scales to determine if any relationships existed and again, no additional relationship was found. Correlations were run using high/low coding (converting all scores above the mean to 2 and below the mean to 1) which yielded no significant findings.

Differences between the locus of control and field dependence groups were examined in relation to three variables (see Table 9):

1) the LES frequency;

2) the LES $\mu > 4$;

3) the ABC low stress to high stress (since these differences were the greatest of any of the change scores).

A two factor analysis of variance revealed no main effects and no interaction between locus of control and field dependence as measured by the LES and the ABC.

The range on the ABC was quite broad, with almost half of the subjects exhibiting fewer behaviors during the more stressful events (yielding negative change scores). The sample was divided into two groups: those above the mean on ABC change scores were labelled

high reactors (n = 18); those below the mean were labelled low reactors (n = 22). It was interesting to note that only seven subjects were high reactors or low reactors for all three change scores (baseline to low stress, low stress to high stress, and baseline to high stress). Data for these correlations are reported in Table 10.

Correlations were also done between ABC change scores and LES frequency scores and yielded a significant negative relationship (r = -0.452: see Table 11).

Since EFT scores correlated so strongly with WAIS-R scores a comparison was made of EFT and LOC scores with WAIS-R scores (see Table 12). It was found that low reactors who were more internal or more field independent tended to score higher on the intelligence measure. For high reactors, greater levels of internality or field indepence related with lower scores on the intelligence measure.

VI. DISCUSSION

The first research question concerned the relationship between locus of control and life stress. The data supported no relationship between the two variables. Locus of control may be hypothesized, on the basis of this sample, to be unrelated to the stress experienced by a subject in the last year of his life.

The second research question concerned the relationship between field dependence and life stress reactivity. Scores obtained on the EFT and the LES frequency were signficantly correlated. This correlation implied that subjects with higher levels of field independence tended to report more life stress than field dependent subjects. No differences were observed in the number of positive and negative events or in the ratings of those events. Since the only correlation observed was between the LES frequency scores, it is likely that the effects of field dependence upon life stress reporting were not very broad. It may be hypothesized that social desirability may be a factor contributing to this finding. It also may be possible that the sample was significantly different from the population and that the findings are some artifact of the uniqueness of the subjects. In support

of the social desirability hypothesis, the literature implied that field independent subjects were less willing to conform than were field dependent subjects. This might be one explanation about the field independent subjects reporting more events. If social desirability was entering into the subjects' reporting of events, it affected the field independent subjects to a lesser degree.

The third research question involved the relationship between locus of control and state stress reactivity. No correlations with ABC data were significant. Locus of control apparently did not have any effect on the subjects' abilities to deal with the stress experienced in the lab.

The fourth research question dealt with the relationship between field dependence and state stress reactivity. No significant relationships were found using the ABC change scores, but one was found with the untreated frequency data. It is likely that the EFT was not actually related with stress reactivity as measured by the ABC since the change scores (the most useful ABC scores) were not correlated. This implied that, in this sample, there was no "buffer effect" by field independence on stress reactivity.

The fifth research question involved the relationship between locus of control and field dependence. A significant correlation was

found. This implied that locus of control and field dependence were significantly similar, possibly more than the literature might indicate. This sample did not support the concept of two disparate variables functioning toward mutual ends, but rather the concept that the two variables are intertwined to a small but significant extent.

Upon examination of the data, several other points not directly related to the research questions seemed worthy of discussion. First, concerning the LES: the average rating for negative events was 5.2 with ratings ranging from 5 - 7. The average rating for positive events was 2.1, with ratings ranging from 1 - 3. The negative events were rated typically very close to the least extreme value (5), while the positive events were rated typically close to the mean value (2). The negative events, then, were rated as being less stressful than the postive events. Not only were the negative events generally not rated as strongly as the positive events, but more positive events were reported than negative events. There appeared to be some influence that caused the subjects to report fewer negative events and to rate them as being less stressful than the postive events. As mentioned previously, this factor may have been social desirability. It is generally better accepted in our society to report information concerning good events rather than bad ones. The

subjects may have been less willing to disclose events which were "bad" and to rate them as being "not so bad".

Another significant factor in the LES data was the rate of reporting for negative events as a whole. This sample reported approximately twice as many negative events as the population at large. This may be related to the factors stated in relation to the LOC data, that the subjects experienced an unusually high number of negative events due to the types of family situations from which they originated.

The variability of the ABC scores was unexpected. Approximately half of the subjects exhibited fewer behaviors as the lab procedures became more stressful. It would appear that the subjects had other ways of dealing with their anxiety than "fidgeting". This may be demonstrative of two factors. First, people may not respond to stress in necessarily predictable ways. Using behavioral reactivity to rate stress may imply misleading conclusions, since some people seemingly reacted to the stress by overtly behaving less. Second, people may not find the same circumstances stressful. The subjects who responded less may have simply not considered giving speeches to be stressful. Both of these hypotheses imply that care is in order when evaluating subjective responses to stressful stimuli.

Generalizations about stress reactivity may be difficult to make, both about what stressors to use and how to measure their effect.

The apparent relationship between LES and state stress reactivity was interesting as well. The more stressful events a subject reported the less of an increase in anxious behavior he was likely to exhibit over the increasingly stressful events. This may be because the subjects who had experienced many stressful events were better able to cope with stress than those with less experience with stress.

This sample scored slightly more externally on the LOC than the general population. One possible explanation for this difference is that this subject population consisted largely of subjects who had encountered presumably high amounts of negative events throughout life (ie., children of alcoholics and chidren of depressives). This might have caused them to adopt a more external control orientation. A second possible explanation for the observed difference is effects from the stressful lab procedures which immediately preceded the testing. It would appear that the anxiety produced a belief in external control. Either explanation implies that locus of control is not necessarily a stable and enduring a characteristic as is currently believed. It may be profoundly influenced by past experiences, and that may be the shift

toward external scores observed in this sample.

The LOC scores did not correlate significantly with the control measure of intelligence, implying that it was not measuring intelligence in any significant way. The EFT, however, did correlate. This was not expected, as the authors of the EFT claim little correlation between it and measures of intelligence. It is possible, however, that the EFT measures abstract reasoning to a large extent and overlaps with the vocabulary test.

The correlations between low and high reactors on the ABC implied a significant relationship in low reactors between internality and/or field independence and a greater decrease in anxious behavior exhibited in increasingly more stressful situations. In low reactors, the more external, field dependent subjects tended to remain at approximately the same level of behavior. In high reactors the relationship was not as strong but implied that greater levels of field independence corresponded to greater increases in anxious behavior exhibited in increasingly more stressful situations. If the exhibition or lack of exhibition of behavior while under stress may be considered a type of coping style, the implications of this are quite interesting. Locus of control scores did not yield any significant correlations with the stress

reactivity measures. However, when controlling for coping style by grouping according to behavioral coping approach, LOC scores were strongly correlated to WAIS-R scores. This implies that coping styles may have a confounding effect on locus of control measurement. Intellingence may also be more highly correlated with locus of control than is currently thought.

It was found that low reactors who were more internal or more field independent tended to score higher on the intelligence measure. For high reactors, greater levels of internality or field indepence related with lower scores on the intelligence measure. The same confounding interaction with coping styles discussed above in relation to locus of control may also be present in field dependence.

VII. IMPLICATIONS

Six major implications for future study may be made based upon the findings discussed above.

First, people tend not respond to stress in necessarily predictable ways and not to experience the same events as stressful. There was a great deal of variabiliaty in the ABC scores. Approximatley half of the subjects responded to the stress (if they perceived it as such) by reacting less. Any future study involving the use of behavioral evaluations would be well advised to consider that individualized behavioral responses may not follow expected patterns. Some attempt should be made to control for the the idiosyncratic approaches to stress of each individual.

Second, behavioral reactivity to stress is likely not a stable trait. Behavioral rates, whether increasing or decreasing, can probably be viewed as one facet of the measurable affective state of an individual. Approximately two thirds of the subjects in this sample were high reactors over some change periods and low reactors over others. This implies that researchers cannot simply assume that behavioral reactivity will remain constant over even short periods of time.

Third, social desirability appears to be a factor in life stress reporting. Negative events were reported less and rated as less severe than positive events were. Any scale which purports to measure life stress should include a measure of social desirability or acquiesence. This may provide some way to control for these effects.

Fourth, field independent subjects reported more stressful events than field dependent subjects. Future research may investigate the situations in which this relationship exists and the extent to which it is influenced by other variables, such as available social referents, degree of the social pressure, denial, or the types of stressful events experienced.

Fifth, field dependence may measure abstract thought to a large degree. Field dependence scores and WAIS-R Vocabulary scores correlated quite well in this sample. Any research using field dependence as a primary variable would be well advised to control for intelligence so that factors related to intelligence are not inadvertently attributed to field dependence.

Sixth, locus of control is likely to be a multidimensional trait, probably interacting with a number of other factors. Further research should explore the relationships between coping styles and locus of

control, as well as the relationship between intelligence and locus of control. It is simply not meaningful at this time to assert that a person is "internal" or "external". There is no solid basis on which to make predictions of a person's behavior given only that he is "internal" or "external".

VIII. CONCLUSIONS

Future research needs to address the issues of multi - factor effects on behavior. People can not meaningfully be categorized into simply internal or external groups. Research needs to address as many of the issues surrounding an individual's behavior as possible, and not try to garner support for a particular concept or theory. There has been much ground work laid in the exploration of locus of control and field dependence. The time has come for future research to explore other additional areas which may impact upon behavior and examine the relationships which exist among them.

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APPENDICES

A. Rotter Locus of Control Scale

B. Embedded Figures Test Response Record

C. Life Experiences Survey

D. Subject Consent Form

E. Anxious Behavior Checklist

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of choices lettered A or B. Please select one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. For each question circle A or B, whichever you choose as the statement most true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice: do not be influenced by your choices to previous questions.

Remember:
Select that alternative which you personally believe to be more true.

I more strongly believe that:

1. A. Children get into trouble because their parents punish them too much.
   B. The trouble with most children nowadays is that their parents are too easy with them.

2. A. Many of the unhappy things in people's lives are partly due to bad luck.
   B. People's misfortunes result from the mistakes they make.

3. A. One of the major reasons we have wars is because people don't take enough interest in politics.
   B. There will always be wars, no matter how hard people try to prevent them.

4. A. In the long run people get the respect they deserve in this world.
   B. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. A. The idea that teachers are unfair to students is nonsense.
   B. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. A. Without the right breaks one cannot be an effective leader.
   B. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. A. No matter how hard you try some people just don't like you.
   B. People who can't get others to like them don't understand how to get along with others.

8. A. Heredity plays the major role in determining one's personality.
   B. It is one's experiences in life which determine what they're like.

9. A. I have often found that what is going to happen will happen.
   B. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. A. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
    B. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. A. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    B. Getting a good job depends mainly on being in the right place at the right time.

12. A. The average citizen can have an influence in government decisions.
    B. This world is run by the few people in power, and there is not much the little guy can do about it.

13. A. When I make plans, I am almost certain that I can make them work.
    B. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. A. There are certain people who are just no good.
    B. There is some good in everybody.

15. A. In my case getting what I want has little or nothing to do with luck.
    B. Many times we might just as well decide what to do by flipping a coin.

16. A. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
    B. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. A. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
    B. By taking an active part in political and social affairs the people can control world events.

18. A. Most people can't realize the extent to which their lives are controlled by accidental happenings.
    B. There really is no such thing as "luck."

19. A. One should always be willing to admit one's mistakes.
    B. It is usually best to cover up one's mistakes.

20. A. It is hard to know whether or not a person really likes you.
    B. How many friends you have depends upon how nice a person you are.

21. A. In the long run the bad things that happen to us are balanced by the good ones.
    B. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. A. With enough effort we can wipe out political corruption.
    B. It is difficult for people to have much control over the things politicians do in office.

23. A. Sometimes I can't understand how teachers arrive at the grades they give.
    B. There is a direct connection between how hard I study and the grades I get.

24. A. A good leader expects people to decide for themselves what they should do.
    B. A good leader makes it clear to everybody what their jobs are.

25. A. Many times I feel that I have little influence over the things that happen to me.
    B. It is impossible for me to believe that chance or luck plays an important role in my life.

26. A. People are lonely because they don't try to be friendly.
    B. There's not much use in trying too hard to please people, if they like you, they like you.

27. A. There is too much emphasis on athletics in high school.
    B. Team sports are an excellent way to build character.

28. A. What happens to me is my own doing.
    B. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. A. Most of the time I can't understand why politicians behave the way they do.
    B. In the long run the people are responsible for bad government on a national as well as on a local basis.

EMBEDDED FIGURES TEST

Response Record

NAME_____ SEX: M ☐ F ☐ AGE_____ DATE_____

GROUP_____ EXAMINER_____

Form Administered: *A (Items 1–12)* ☐ *B (Items 13–24)* ☐ *Practice Item: Solution Time*_____

Item No.	*Comments*	*Time Data*	*Solution Time (in seconds)*
1-A or 13-E			
2-B or 14-C			
3-C or 15-D			
4-D or 16-G			
5-E or 17-A			
6-A or 18-E			
7-F or 19-B			
8-E or 20-C			
9-C or 21-G			
10G or 22-A			
11-A or 23-E			
12-H or 24-C			

COMMENTS:

TOTAL TIME (*in seconds*)

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Life Experiences Survey

Listed below are a number of events which sometimes bring about change in the lives of those who experience them. Please place a check mark in front of those events which you have experienced during the past year, that is, since this time a year ago.

Also, for each item checked, please indicate the extent to which you viewed the event as having either a good, or positive, impact or a bad, or negative, impact on your life at the time the event occurred. That is, indicate the type and extent of impact that the event had by circling the rating closest to your view of impact. Circling 7 would indicate an extremely bad impact; 6 would be a moderately bad impact; and 5 would be a somewhat bad impact. Circling 4 suggests no impact, either good or bad. Circling 1 would indicate an extremely good impact; 2 would be a moderately good impact; and 3 would be a somewhat good impact. Are there any questions before we start?

		Extremely Bad	Moderately Bad	Somewhat Bad	No Impact	Somewhat Good	Moderately Good	Extremely Good
____	1. Marriage	7	6	5	4	3	2	1
____	2. Put in jail or prison	7	6	5	4	3	2	1
____	3. Death of spouse/partner	7	6	5	4	3	2	1
____	4. Major change in sleeping habits (much more or much less sleep)	7	6	5	4	3	2	1
	5. Death of close family member:							
	____ a. mother	7	6	5	4	3	2	1
	____ b. father	7	6	5	4	3	2	1
	____ c. brother	7	6	5	4	3	2	1
	____ d. sister	7	6	5	4	3	2	1
	____ e. grandmother	7	6	5	4	3	2	1
	____ f. grandfater	7	6	5	4	3	2	1
	____ g. other (specify)	7	6	5	4	3	2	1
____	6. Major change in eating habits (much more or much less food intake)	7	6	5	4	3	2	1

	Extremely Bad	Moderately Bad	Somewhat Bad	No Impact	Somewhat Good	Moderately Good	Extremely Good
____ 7. Foreclosure on mortgage or loan	7	6	5	4	3	2	1
____ 8. Death of close friend	7	6	5	4	3	2	1
____ 9. Outstanding personal achievement	7	6	5	4	3	2	1
____ 10. Minor law violations (traffic tickets, disturbing the peace, etc.)	7	6	5	4	3	2	1
____ 11. Pregnancy of wife/partner/girlfriend	7	6	5	4	3	2	1
____ 12. Changed work situation (different work responsibility, major change in working conditions, working hours, etc.)	7	6	5	4	3	2	1
____ 13. New job	7	6	5	4	3	2	1
14. Serious illness or injury of close family member:							
____ a. father	7	6	5	4	3	2	1
____ b. mother	7	6	5	4	3	2	1
____ c. sister	7	6	5	4	3	2	1
____ d. brother	7	6	5	4	3	2	1
____ e. grandfather	7	6	5	4	3	2	1
____ f. grandmother	7	6	5	4	3	2	1
____ g. other (specify)	7	6	5	4	3	2	1
____ 15. Sexual difficulties	7	6	5	4	3	2	1
____ 16. Trouble with employer (in danger of losing job, being suspended, demoted, etc.)	7	6	5	4	3	2	1
____ 17. Trouble with in-laws	7	6	5	4	3	2	1
____ 18. Major change in financial status (a lot better off or a lot worse off)	7	6	5	4	3	2	1

LES-3

	Extremely Bad	Moderately Bad	Somewhat Bad	No Impact	Somewhat Good	Moderately Good	Extremely Good
____ 19. Major change in closeness of family members (increased or decreased closeness)	7	6	5	4	3	2	1
____ 20. Gaining a new family member (through birth, adoption, family member moving in, etc.)	7	6	5	4	3	2	1
____ 21. Change in residence	7	6	5	4	3	2	1
____ 22. Divorce	7	6	5	4	3	2	1
____ 23. Major change in church activities (increased or decreased attendance)	7	6	5	4	3	2	1
____ 24. Getting back together with spouse/ partner after a separation	7	6	5	4	3	2	1
____ 25. Major change in number of arguments with spouse/partner (a lot more or a lot less arguments)	7	6	5	4	3	2	1
____ 26. Change in spouse's/partner's work outside the home (beginning work, ceasing work, changing to a new job, etc.)	7	6	5	4	3	2	1
____ 27. Major change in usual type and/or amount of recreation	7	6	5	4	3	2	1
____ 28. Borrowing more than $10,000 (buying home, business,etc.)	7	6	5	4	3	2	1
____ 29. Borrowing less than $10,000 (buying car, TV, getting school loan, etc.)	7	6	5	4	3	2	1
____ 30. Being fired from job	7	6	5	4	3	2	1
____ 31. Wife/partner having abortion	7	6	5	4	3	2	1
____ 32. Major illness or injury	7	6	5	4	3	2	1
____ 33. Major change in social activities e.g., parties, movies, visiting, etc. (increased or decreased participation)	7	6	5	4	3	2	1

	Extremely Bad	Moderately Bad	Somewhat Bad	No Impact	Somewhat Good	Moderately Good	Extremely Good
____ 34. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighborhood, etc.)	7	6	5	4	3	2	1
____ 35. Separation from spouse/partner (due to conflict)	7	6	5	4	3	2	1
____ 36. Serious injury or illness of close friend	7	6	5	4	3	2	1
____ 37. Separation from son or daughter	7	6	5	4	3	2	1
____ 38. Separation from spouse/partner (due to work, travel, etc.)	7	6	5	4	3	2	1
____ 39. Engagement	7	6	5	4	3	2	1
____ 40. Breaking up with girlfriend/ boyfriend	7	6	5	4	3	2	1
____ 41. Leaving home for the first time	7	6	5	4	3	2	1
____ 42. Getting back together with girlfriend/boyfriend	7	6	5	4	3	2	1
____ 43. Major achievement in sports (getting letter, setting record, etc.)	7	6	5	4	3	2	1
____ 44. Major achievement in school (e.g., awards, honor society, etc.)	7	6	5	4	3	2	1
____ 45. Closeness to adults other than family members (teachers, coach, etc.)	7	6	5	4	3	2	1
____ 46. Difficulties with adults other than relatives (teacher, police, etc.)	7	6	5	4	3	2	1

	Extremely Bad	Moderately Bad	Somewhat Bad	No Impact	Somewhat Good	Moderately Good	Extremely Good
____ 47. Beginning a new school experience	7	6	5	4	3	2	1
____ 48. Changing to a new school	7	6	5	4	3	2	1
____ 49. Failing a course	7	6	5	4	3	2	1
____ 50. Joining a fraternity/sorority	7	6	5	4	3	2	1
____ 51. Financial problems concerning school (in danger of not having enough money to continue)	7	6	5	4	3	2	1
____ 52. Taking a vacation/long trip from home	7	6	5	4	3	2	1

Other experiences during the past year which have had an impact on your life. List and rate.

____ 53. _____	7	6	5	4	3	2	1
____ 54. _____	7	6	5	4	3	2	1
____ 55. _____	7	6	5	4	3	2	1

CONFIDENTIALITY: I understand that any information obtained about me will be held in strict confidence and will be available only for research and professional use by the research staff. Such information that will carry personal identifying material will be kept in locked files, and only the research staff will have access to these locked files. I do understand that research records, just like hospital records, may be subpoenaed by court order. It has been explained to me that my identity will not be revealed in any description or publication of this research. Therefore, I consent to such publication for scientific purposes. I understand that taping equipment will be used and that the tapes will be destroyed at the end of the study.

RIGHT TO WITHDRAW: I understand that I have the right to refuse to participate or to withdraw from this study at any time and that my questions about the study will be answered by the research staff. Finally, I understand that withdrawal from this study will in no way prejudice any present or future benefits to which I am otherwise entitled at this institution. I also understand that my withdrawal will not affect remuneration.

COMPENSATION FOR ILLNESS OR INJURY: I understand that in the event of a physical injury or physical or mental illness resulting from research procedures, no monetary compensation will be made but any immediate emergency medical treatment which may be necessary will be given to me.

VOLUNTARY CONSENT: I certify that I have read the preceding or it has been read to me and that I understand its contents. Any questions I have pertaining to the research have been and will be answered by Dr. Blane or one of his staff. Any questions I have concerning my rights as a research subect will be answered by the office of the Senior Vice Chancellor, Health Science (624-2600). A copy of this consent form will be given to me. My signature below means that I have freely agreed to participate in this experimental study.

---------- ----------
Date Subject Signature

Witness

INVESTIGATOR'S CERTIFICATION:

I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participating in this research study, and have answered any questions that have been raised.

---------- ----------
DATE SIGNATURE OF INVESTIGATOR OR MEMBER OF RESEARCH STAFF

ABC SUMMARY DATA SHEET

SUBJECT NO. _____
DATE _____

SESSION _____
TIME _____
OBSERVER _____

BEHAVIOR	F	% INTERVAL	% BEHAVIOR	RELIABILITY
Total Body				
PA				
SY				
SH				
CS				
EX				
Leg/Foot				
LS				
SW				
LC				
FT				
FS				
KK				
LW				
Arm/Hand				
AS				
AX				
HS				
HW				
FC				
TA				
TY				
SC				
KC				
AC				
Facial				
MM				
GR				
BI				
CJ				
TF				
SM				
FG				
SG				
Breathing				
DB				
RB				
SI				
MO				

BEHAVIOR	F	% INTERVAL	% BEHAVIOR	RELIABILITY
Grooming				
SS				
SM				
SN				
Verbal				
Other				
BN				
BO				
TH				
PR				
CT				
GS				
Posture				
Very Relaxed				
Somewhat Relaxed/Rigid				
Very Rigid				
TOTAL				

TASK _____ 88

1				1 3 5
2				1 3 5
3				1 3 5
4				1 3 5
5				1 3 5
6				1 3 5
7				1 3 5
8				1 3 5
9				1 3 5
10				1 3 5
11				1 3 5
12				1 3 5
13				1 3 5
14				1 3 5
15				1 3 5
16				1 3 5
17				1 3 5
18				1 3 5
19				1 3 5
20				1 3 5

ANXIETY BEHAVIOR CHECKLIST (ABC)

Total Body Movements

PA: Pacing
1. Taking two or more steps in any direction. (subject may walk in one direction and stop or walk in one direction, turn, and walk in the other direction).

SY: Swaying
1. Body rocking using at least the torso. (may include entire body; subject may be sitting or standing).

SH: Shifting Position
1. Shifting body from one foot to the other.
2. Shifting weight from one foot to the other.

CS: Changing Seats

EX: Exercising
1. Stretching muscles of body including neck, arms, hands, legs, back, etc.

Leg and Foot Movements

LS: Leg Shaking
1. Toes on floor, heel bouncing up and down. (subject may be sitting or standing).

SW: Leg Swinging
1. Legs are crossed, one leg swinging above the next.

LC: Leg Crossing/Uncrossing
1. At knees or at ankles.

FT: Foot Tapping
1. Heel on floor, toes bouncing up and down.

FS: Foot Shaking
1. Foot not touching floor (either crossed over other leg or wrapped behind it) and bouncing.

KK: Knee Knocking
1. Trembling of legs, whole leg shakes.

LW: Leg Wrapping
1. Wrapping or unwrapping legs and/or feet around chair legs.

Arm/Hand_Movements

AS: Arm Swinging
1. Swinging one or both arms at sides, over head, etc.

AX: Arm Crossing
1. Crossing arms anywhere along length of the arm (at elbows, wrists, folding arms, etc).

HS: Hand Shaking
1. Trembling or shaking hands.

HW: Hand Wringing
1. Wringing of hands; twisting, entwining fingers.

FC: Fist Clenching
1. Clenching and unclenching one or both fists.

TA: Tapping
1. Tapping hands against body, chair, wall, etc.
2. Tapping fingers against each other, against body, or against another object.
3. Tapping pen against any other object.

TY: Toying
1. Running fingers repeatedly through hair, playing with hair (twisting, etc.)
2. Playing with clothes, pen or other object.

SC: Scratching

KC: Knuckle Cracking
1. Making popping or cracking sounds by manipulating finger joints.

AC: Adjust Clothing
1. Fussing or toying with clothing in nervous, unpurposeful way, such as yanking at collar, pushing up sleeves, tugging at socks.

Facial Movements

MM: Mouth Movements
1. Twitches, tics of mouth area, including tongue movements such as licking lips.

GR: Grimacing
1. A total facial expression that includes frowning, turning mouth down, looking disgusted, or screwing up the facial muscles.

BI: Biting
1. Biting lips.

CJ: Clenched Jaw
1. Gritting teeth, tensing facial muscles.

TF: Touching Face
1. Massaging, rubbing, feeling parts of face.
2. Not resting head in hand.

SM: Smiling
1. Showing or not showing teeth.
2. Corners of mouth must turn up.
3. Includes laughing, snickering, chuckling, etc.

FG: Fixed Gaze
1. Staring fixedly at something or off into space.

SG: Shifting Gaze
1. Eyes darting around room.

Breathing

DB: Deep Breathing
1. Obvious chest and/or shoulder movement with one or more lengthy (greater than 3 seconds) non-vocal inhalation and exhalation of breath.

RB: Rapid Breathing
1. Obvious chest and/or shoulder movement with one or more quick, short (about one second) inhalation and exhalation of breath.

SI: Sighing
1. Audible, nonverbal, vocal sound with deep breath and distressed affect.

MO: Moaning
1. Audible, nonverbal groaning sound with distressed affect but with or without deep breaths.

Grooming

PR: Primping
1. Primping, fixing clothing, particularly if looking in mirror, smoothing out clothes, adjusting collar, pulling up socks, tucking in shirt, etc.

FH: Fix Hair
1. Combing, styling, smoothing, primping, particularly if looking in mirror.

SN: Self Inspection
1. Checking over appearance with or without mirror.

Verbalizations

VR: Verbalizations
1. Words, phrases, or sentences irrelevant to the context of the speech (eg "I can't believe I have to do this.").

Other

BN: Biting Nails

BO: Biting Other Objects

TH: Clearing Throat
1. Audible, cough-like effort to clear the throat or windpipe.

PR: Perspiration
1. Obvious beading of sweat on skin, or moisture on clothes.

CT: Check Time
1. Looking at watch

GS: Expellation of Gas
1. Belching, flatulation, etc.

Posture

1 Very Relaxed
3 Somewhat Relaxed/Rigid
5 Very Rigid

TABLES

Table 1.

LOC Descriptive Statistics

Statistic	Value
Population Mean	10.07
Sample Mean	13.475
Standard Deviation	0.639
Variance	16.358
Maximum	22
Minimum	6

Table 2.

EFT Descriptive Statistics

Statistic	Value
Population Mean	45.5 - 54.3
Sample Mean	52.158
Standard Deviation	37.053
Variance	1372.944
Maximum	168.92
Minimum	8.25

Table 3

LES Descriptive Statistics

Statistic		Value
Population Mean, negative events		10.22
Population Mean, positive events		9.74
Sample Mean, negative events		21.0
Sample Mean, positive events		9.74
Sample Mean, frequency		10.45
	Standard Deviation	4.568
	Maximum	22
	Minimum	1
Sample Mean, ratings of negative events		5.2
	Minimum	5.0
	Maximum	7.0
Sample Mean, ratings of positive events		2.1
	Maximum	3.0
	Minimum	1.0

Table 4

ABC Descriptive Statistics

Statistic	Value
ABC 1:	
Mean	32.6
Standard Deviation	16.358
Maximum	82
Minimum	6
ABC 2:	
Mean	37.229
Standard Deviation	14.355
Maximum	65
Minimum	10
ABC 3:	
Mean	26.086
Standard Deviation	7.898
Maximum	38
Minimum	7

ABC 4:	
Mean	39.943
Standard Deviation	11.953
Maximum	63
Minimum	17
ABC 5:	
Mean	26.829
Standard Deviation	7.778
Maximum	44
Minimum	10
Baseline to Low Stress Change:	
Mean	1.394
Standard Deviation	3.222
Maximum	8.55
Minimum	-5.65
Low Stress to High Stress Change:	
Mean	3.457
Standard Deviation	15.91
Maximum	36
Minimum	-26

Table 5.

Between Group Differences, LOC

One Factor ANOVA

Source	DF	Sum Squares	Mean Square	F-Test
Between Groups	2	73.091	36.546	2.394
Within Groups	37	564.884	15.267	p = 0.1053
Total	39	637.975		

Model II estimate of between component variance = 10.639

Table 5.

Between Group Differences, LOC

One Factor ANOVA

Source	DF	Sum Squares	Mean Square	F-Test
Between Groups	2	73.091	36.546	2.394
Within Groups	37	564.884	15.267	p = 0.1053
Total	39	637.975		

Model II estimate of between component variance = 10.639

Table 6.

Between Group Differences, EFT

One Factor ANOVA

Source	DF	Sum Squares	Mean Square	F-Test
Between Groups	2	4855.721	2427.86	1.845
Within Groups	37	48689.08	1315.92	p = 0.1723
Total	39	53544.80		

Model II estimate of between component variance = 555.97

Table 7.

LOC Correlations

Variables	r value
LOC x EFT	0.31
LOC X WAIS-R	0.27
LOC X ABC1	-0.06
LOC X ABC2	0.01
LOC X ABC3	-0.02
LOC X ABC4	-0.10
LOC X ABC5	0.20
LOC X ABC baseline to low stress	-0.01
LOC X ABC low stress to high stress	0.13
LOC X ABC baseline to high stress	0.08
LOC X LES frequency	0.01
LOC X LES $\mu > 4$	0.11
LOC X LES $\mu < 4$	0.06

Table 8.

EFT Correlations

Variables	r value
EFT X LOC	0.31
EFT X WAIS-R	0.48
EFT X ABC1	0.07
EFT X ABC2	-0.08
EFT X ABC3	0.35
EFT X ABC4	-0.07
EFT X ABC5	0.26
EFT X ABC baseline to low stress	0.01
EFT X ABC low stress to high stress	0.03
EFT X ABC baseline to high stress	0.03
EFT X LES frequency	0.34
EFT X LES $\mu > 4$	-0.29
EFT X LES $\mu < 4$	-0.17

Table 9.

LOC and EFT 2 x 2 ANOVA

Two Factor ANOVA, ABC Low Stress to High Stress

Source	DF	Sum Squares	Mean Square	F-Test	p
LOC HI/LOW (A)	1	11.434	11.434	0.042	0.8381
EFT HI/LOW	1	249.683	249.683	0.927	0.3431
AB	1	4.986	4.986	0.019	0.8927
Error	31	8350.409	269.368		

Two Factor ANOVA, LES MEAN NEGATIVE EVENTS

Source	DF	Sum Squares	Mean Square	F-Test	p
LOC HI/LOW (A)	1	0.724	0.724	0.394	0.5346
EFT HI/LOW	1	3.917	3.917	2.132	0.1538
AB	1	0.094	0.094	0.051	0.8223
Error	33	60.637	1.837		

Two Factor ANOVA, LES FREQUENCY

Source	DF	Sum Squares	Mean Square	F-Test	p
LOC HI/LOW (A)	1	3.731	3.731	0.176	0.6769
EFT HI/LOW	1	19.441	19.441	0.920	0.3440
AB	1	35.225	35.225	1.666	0.2050
Error	36	761.154	21.143		

Table 10.

Correlations with High and Low Reactors

Variables	Low Reactors	High Reactors
	n = 22	n = 18
Baseline to Low Stress		
EFT x ABC	r = -0.14	r = 0.50
LOC x ABC	r = -0.01	r = -0. 24
Low Stress to High Stress		
EFT x ABC	r = 0.17	r = 0.01
LOC x ABC	r = -0.11	r = 0.37
Baseline to High Stress		
EFT x ABC	r = -0.13	r = 0.43
LOC x ABC	r = 0.06	r = -0.13

Table 11.

Correlations with ABC and LES Frequency Scores

Variable Names	r value
ABC baseline to low stress x LES	-0.32
ABC low stress to high stress x LES	-0.45
ABC baseline to high stress x LES	-0.29

Table 12.

Correlations with Low Reactors and High Reactors

Variables	Low Reactors	High Reactors
	n = 22	n = 18
Baseline to Low Stress		
EFT x WAIS-R	r = 0.50	r = 0.48
LOC x WAIS-R	r = 0.67	r = -0.04
Low Stress to High Stress		
EFT x WAIS-R	r = 0.61	r = 0.40
LOC x WAIS-R	r = 0.33	r = 0.36
Baseline to High Stress		
EFT x WAIS-R	r = 0.43	r = 0.57
LOC x WAIS-R	r = 0.61	r = 0.01